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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/422,154	10/21/99	POWELL	C 303/1/151

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EXAMINER	
WYROZEBSKI, LEE, K	

ART UNIT PAPER NUMBER

1714  
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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

<b>Office Action Summary</b>	Application No.	Applicant(s)
	09/422,154	POWELL ET AL.
	Examiner Katarzyna I Wyrozebski-Lee	Art Unit 1714

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM  
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If no period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1) Responsive to communication(s) filed on 08 January 2001.

2a) This action is FINAL.      2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4) Claim(s) 1,4-10,12-20 and 31-44 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5) Claim(s) \_\_\_\_\_ is/are allowed.

6) Claim(s) 1,4-10,12-20 and 31-44 is/are rejected.

7) Claim(s) \_\_\_\_\_ is/are objected to.

8) Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.

11) The proposed drawing correction filed on \_\_\_\_\_ is: a) approved b) disapproved.

12) The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. § 119**

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

**Attachment(s)**

15) Notice of References Cited (PTO-892)

16) Notice of Draftsperson's Patent Drawing Review (PTO-948)

17) Information Disclosure Statement(s) (PTO-1449) Paper No(s) 8.

18) Interview Summary (PTO-413) Paper No(s). \_\_\_\_.

19) Notice of Informal Patent Application (PTO-152)

20) Other: \_\_\_\_\_

## DETAILED ACTION

In the light of the applicant's amendment, the 102 rejection over the prior art of Mardis has been withdrawn and new rejection, satisfying a new limitation of the D<sub>001</sub> peak is stated in this office action.

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.
2. Claims 1-20 and 31-44 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In the independent claims 1, 10 and 31 as well as some of the dependent claims the applicant recited that the D<sub>001</sub> peak decreased. With respect to the above recitation, the examiner looked into the examples of the present invention and has drawn a following conclusion. The applicant intercalated the clay material with onium salt and the D<sub>001</sub> peak of the present invention was very high, which signified a high exfoliation. Next in the example 3, the applicant took intercalated clay of example 1 and incorporated this into the polystyrene polymer. As a result, the D<sub>001</sub> peak was gone. This signifies that the exfoliation of the clays was complete.

The term "decreased" or "substantially absent" is not the same as gone, therefore the recitation of decreased D<sub>001</sub> peak in claims 1, 10, 31 and "substantially absent" in the new claims 42-44 of the is a new matter.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1 is rendered as indefinite claims since it contains an improper Markush language. According to MPEP 2173.05(h) the Markush language may recite for example: "...wherein R is selected from the group consisting of A, B, C and D" or "...wherein R is A, B, C or D".

#### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1, 4-10, 12-20 and 31-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maxfield (WO 93/04117) in view of Franklin (U.S. 6,037,315).

With respect to the above difference, Maxfield discloses a composition comprising clay intercalated with onium ions and incorporated into a polymer matrix. The swellable material of the prior art of Maxfield includes silicates such as montmorillonite, nontronite, beidelite, hectorite, saponite and the like (page 9, lines 22-30). The cation activity of the clays is 20-150 per 100 grams (page 10, lines 26-32). The ammonium salts can have moieties such as long chain fatty acids (page 21-24) as well as their ester derivatives (page 15, line 19) among many already known onium compounds.

In the process of Maxfield, the clay material is dispersed in water forming dispersion (page 21, lines 33-37) which is mixed with relatively high shear until exfoliated. Then swelling/compatibilizing agents are added (page 22, lines 1-2). Exfoliated clays would signify that the spacing between the layers is zero, since all the clay material is now a single layer material which is inherent.

At the end the polymer is incorporated into the thermoplastic polymers, which include polystyrene (page 27, line 30). The additives in the prior art of Maxfield include nucleating agents, fillers, plasticizers, impact modifiers, and the like (page 28, lines 30-37). The mixture containing exfoliated clay and polymer is then melt processed utilizing various types of equipment such as mixers and extruders. The molding composition can be used to make products such as panels, films, sheets and the like (page 36, lines 15-37). The above disclosure of Maxfield further satisfies newly added claims 31-44.

The difference between the present invention and the prior art of Maxfield is showing of a particular ammonium compound which can be utilized in organoclays.

With respect to the above difference, the prior art of Franklin discloses an ammonium compound which although are utilized in cosmetic industry can as well be mixed with ceramics such as kaolin clay or already modified smectite clay and polymers (col. 19, lines 59-63). Since the ammonium compound of Franklin can be utilized equally with modified or unmodified clays utilizing them with the smectite clay of Mardis would be an obvious modification suggested by this secondary reference. In particular, the prior art of Franklin concentrates on actually quaternary ammonium compound composition more than its use. The quaternary ammonium compound of Franklin is a mixture of mono-, di- and triesters. The amount of the diester is

greater than 50% and the amount of triester is less than 25% which further satisfies the requirements of claims 4, 5, 12, 13, 24 and 25 of the present invention (see Abstract). In the disclosure of Franklin, the molar ration of the fatty acid to the alkanol amine is generally in the range of 1.4-2.0 (col. 4, lines 44-45) as it is also required by claims 14 and 26 of the present invention. These compounds are products of C<sub>12</sub>-C<sub>22</sub> fatty acids or hydrogenation products thereof with alkanol amine in the presence of the acid catalyst (col. 4, lines 3-11). The esters utilized in the disclosure of Franklin are derivatives of the fatty acids such as soy, tallow, palm, rapeseed, lard and the like (col. 4, lines 16-21). The fatty acids of the disclosure of Franklin have iodine value of 20-90 and with the amounts of mono-, di- and triesters discussed earlier satisfy the requirement of claims 6-9, 15-18, and 27-30 of the present invention. With respect to the anion, which accompanies the cationic clay compound such include halogens and sulfates such as CH<sub>3</sub>SO<sub>4</sub> or C<sub>2</sub>H<sub>5</sub>SO<sub>4</sub> (col. 6, lines 29-30).

Exfoliation by the definition is a process, which delaminates layers of the silicates, leaving the silicate with one layer. If the exfoliation is complete, the D<sub>001</sub> peak will inherently disappear, since there will be no distance between two layers to measure. Having a composition comprising clay intercalated with onium ions, such clay will inherently swell until it reaches certain limit and exfoliates.

In the light of the above disclosure it would have been obvious to one with the ordinary skill in the art, that combining the intercalated clay with polymer will cause delamination of the layers of the silicate as it is shown in the prior art of Maxfield. Just like in Franklin, the prior art of Maxfield enables esters as substituents of the ammonium salts

9. Applicant's arguments filed on 1/8/2001 have been fully considered but they are not persuasive.

In the amendment filed on 1/8/2001, the applicant expressed following arguments:

- a) Mardis does not teach the features of the present invention. The features include decreased  $D_{001}$  peak, specific mixture of quaternary ammonium salts. Further an example is pointed out, which shows the difference between the present invention and the prior art.
- b) Mardis does not show high exfoliation where  $D_{001}$  is decreased.

With respect to the recitation of the  $D_{001}$  peak, although it is a new matter a new reference of Maxfield had been incorporated. The prior art of Maxfield discloses a process where clay is mixed with intercalating material and exfoliated according to the process claimed in the present invention. Since the exfoliation in the prior art of Maxfield is complete it is inherently high.

With respect to the argument regarding the specific mixture of the salts, prior art of Franklin discloses them as modifiers for clays.

The applicant draws the examiner's attention to the examples of the present application, however, the examiner is unable to see any unexpected results, since the examples are very general and do not disclose any specific salts which are utilized in order to intercalate the clay. It is barely mentioned that the salt is a mixture of di-, ter-, mono-esters, but what is it. The examiner asks that the applicant provide actual examples in order to determine the unexpected results. Any phone call regarding this issue is welcome.

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katarzyna I. Wyrozebski-Lee whose telephone number is (703) 306-5875. The examiner can normally be reached on Monday through Thursday from 7:00 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan, can be reached at (703) 306-2777. The fax phone number for the organization where this application or proceeding is assigned is (703) 305-3599.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Katarzyna I. Wyrozebski-Lee

February 14, 2001

EDWARD J. CAIN  
PRIMARY EXAMINER  
GROUP 1500

